



16-Port 10/100/1000 Mbps Auto-Sensing Gigabit Switch

User Guide

SMC8516T



EZ Switch 10/100/1000 User Guide

From SMC's EZ line of low-cost workgroup LAN solutions

SMC[®]

Networks

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December 2003

Pub. # 15000009400H R01

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* SMC will provide warranty service for one year following discontinuance from the active SMC price list. Under the limited lifetime warranty, internal and external power supplies, fans, and cables are covered by a standard one-year warranty from date of purchase.

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COMPLIANCES

FCC - Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

EC Conformance Declaration - Class A

SMC contact for these products in Europe is:

SMC Networks Europe,
Edificio Conata II,
Calle Fructuós Gelabert 6-8, 2^a, 4^a,
08970 - Sant Joan Despí,
Barcelona, Spain.

This information technology equipment complies with the requirements of the Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied:

RFI Emission:

- Limit class A according to EN 55022:1998, IEC 60601-1-2 (EMC, medical)
- Limit class A for harmonic current emission according to EN 61000-3-2/1995
- Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3/1995

Immunity:

- Product family standard according to EN 55024:1998
- Electrostatic Discharge according to EN 61000-4-2:1995
(Contact Discharge: ± 4 kV, Air Discharge: ± 8 kV)

COMPLIANCES

- Radio-frequency electromagnetic field according to EN 61000-4-3:1996 (80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m)
- Electrical fast transient/burst according to EN 61000-4-4:1995 (AC/DC power supply: ± 1 kV, Data/Signal lines: ± 0.5 kV)
- Surge immunity test according to EN 61000-4-5:1995 (AC/DC Line to Line: ± 1 kV, AC/DC Line to Earth: ± 2 kV)
- Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m)
- Power frequency magnetic field immunity test according to EN 61000-4-8:1993 (1 A/m at frequency 50 Hz)
- Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994 ($>95\%$ Reduction @10 ms, 30% Reduction @500 ms, $>95\%$ Reduction @5000 ms)

LVD:

- EN 60950 (A1/1992; A2/1993; A3/1993; A4/1995; A11/1997)

MDD:

- IEC 60601-1

Industry Canada - Class A

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministère des Communications.

Japan VCCI Class A

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Safety Compliance

Underwriters Laboratories Compliance Statement

Important Before making connections, make sure you have the correct cord set. Check it (read the label on the cable) against the following:

Operating Voltage	Cord Set Specifications
120 Volts	UL Listed/CSA Certified Cord Set
	Minimum 18 AWG
	Type SVT or SJT three conductor cord
	Maximum length of 15 feet
	Parallel blade, grounding type attachment plug rated 15 A, 125 V
240 Volts (Europe only)	Cord Set with H05VV-F cord having three conductors with minimum diameter of 0.75 mm ²
	IEC-320 receptacle
	Male plug rated 10 A, 250 V

The unit automatically matches the connected input voltage. Therefore, no additional adjustments are necessary when connecting it to any input voltage within the range marked on the rear panel.

Wichtige Sicherheitshinweise (Germany)

1. Bitte lesen Sie diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie keine Flüssigoder Aerosolreiniger. Am besten eignet sich ein angefeuchtetes Tuch zur Reinigung.
4. Die Netzanschlußsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Beschädigungen hervorrufen.
7. Die Belüftungsöffnungen dienen der Luftzirkulation, die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen, die sich am Gerät befinden, sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von autorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
 - a. Netzkabel oder Netzstecker sind beschädigt.
 - b. Flüssigkeit ist in das Gerät eingedrungen.
 - c. Das Gerät war Feuchtigkeit ausgesetzt.
 - d. Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
 - e. Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
 - f. Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
15. Stellen Sie sicher, daß die Stromversorgung dieses Gerätes nach der EN 60950 geprüft ist. Ausgangswerte der Stromversorgung sollten die Werte von AC 7.5-8 V, 50-60 Hz nicht über oder unterschreiten sowie den minimalen Strom von 1 A nicht unterschreiten.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weniger.

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INTRODUCTION

The EZ Switch™ 10/100/1000, SMC8516T, is a high-performance Gigabit Ethernet switch designed for delivering Gigabit connectivity to the desktop. It provides 16 full-duplex 1000BASE-T ports that significantly improve network performance and boost throughput for high-bandwidth applications. With 32 Gigabits of aggregate bandwidth, this switch provides the quickest solution to meeting the growing demands on your network's limited resources.

Features and Benefits

- Auto-negotiation supported on all ports
- Automatic MDI/MDI-X operation
- IEEE 802.3ab, 802.3u, and 802.3 compliance ensures compatibility with standards-based hubs, switches and cards from any vendor
- Store-and-forward switching ensures error-free transmission
- Half- and full-duplex flow control prevents packets from being dropped under heavy loading
- Plug-and-play—nothing to configure
- “At-a-glance” LEDs for port and system status monitoring
- Desktop or rack installation

Front Panel RJ-45 Ports

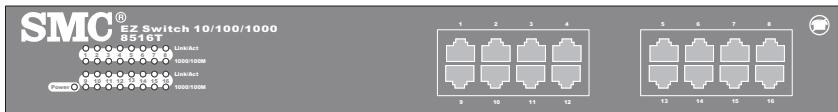
The EZ Switch 10/100/1000 features 16 1000BASE-T ports with RJ-45 connectors located on the front panel of the switch. Because all ports support automatic MDI/MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs.

Front Panel LEDs

The front panel of the switch provides status LEDs for “at-a-glance” system monitoring. The following table details the functions of the various indicators.

Port and System Status LEDs		
LED	Condition	Status
Power	On	The switch is receiving power.
	Off	The switch is not receiving power.
Ports		
Link/Act	On	The port has established a valid network connection.
	Off	The port has not established a network connection.
	Flashing	Traffic is passing through the port.
100/ 1000M	On Green	Indicates the port is operating at 1000 Mbps.
	On Yellow	Indicates the port is operating at 100 Mbps.
	Off	Indicates the port is operating at 10 Mbps.

SMC8516T



Rear Panel

The AC power receptacle is located on the rear panel of the switch.

INSTALLING THE SWITCH

Before installing the switch, verify that you have all the items listed under “Package Contents.” Note that the switch can be installed on any suitably large flat surface or in a standard EIA 19-inch rack.

Package Contents

The EZ Switch 10/100/1000 includes:

- EZ Switch 10/100/1000 (SMC8516T)
- Four rubber foot pads
- Rack-mount bracket kit
- Appropriate AC power cord
- This User Guide
- SMC Warranty Registration Card

Selecting a Site

Be sure to follow the site selection guidelines below when choosing a location:

- Select a suitable location for the switch:
 - It should be accessible for installing, cabling and maintaining the switch.
 - The temperature and humidity should be within the ranges listed in the specifications.
 - The status LEDs should be clearly visible.

- There should be adequate space (approximately two inches) on all sides for proper air flow.
- Make sure twisted-pair cable is always routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference such as radios, transmitters, etc.
- Make sure that a properly grounded power outlet is within 2.44 meters (8 feet) of the switch and is powered from an independent circuit breaker. As with any equipment, using a filter or surge suppressor is recommended.

Instructions

1. **Positioning the Switch:** For desktop or shelf mounting, attach the four adhesive foot pads to the bottom of the switch. For rack mounting, install into a standard EIA 19-inch rack using the included brackets.
2. **Applying Power:** Plug one end of the power adapter into the socket on the switch's rear panel, and the other end into an appropriate electrical outlet. Check the Power LED to be sure power is on.

Note: It is not necessary to power off the switch before connecting or disconnecting any UTP cables, as these actions will not disrupt the operation of other devices attached to the switch.

3. **Connecting PCs:** Connect each PC to an RJ-45 port on the switch using Category 5 or 5e shielded or unshielded twisted-pair (UTP or STP) cable, maximum length 100 meters (328 ft). The EZ Switch 10/100/1000 will support up to 16 PCs. All ports on the switch support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs.

Note: If an attached device does not support auto-negotiation, the data rate will be sensed automatically and the communication mode will default to half duplex.

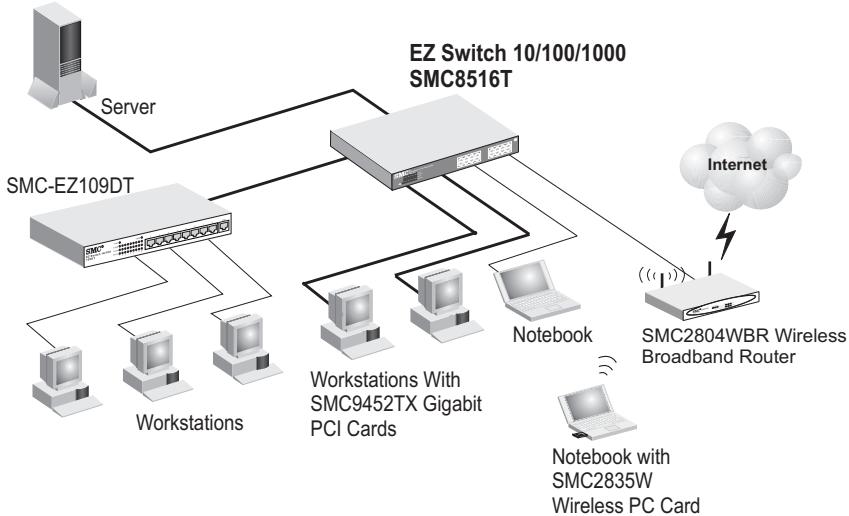
INSTALLING THE SWITCH

4. **Cascading Switches and Other Network Devices:** All the ports on the switch support automatic MDI/MDI-X configuration for cable connections. This allows you to use straight-through cable to connect to other switches or hubs from any port on the switch. No crossover cables or other device settings are needed. See the “Cable Specifications” on page 9 of this guide for further information.

Caution: Do not plug a phone jack connector into any RJ-45 port. This may damage the switch. Instead, use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

APPLICATION EXAMPLE

A typical application for the SMC8516T is illustrated below.



TROUBLESHOOTING

Diagnosing Switch Indicators

1. Symptom

Power LED does not light after power on.

Probable Causes

- AC power cord may be defective.

Possible Solutions

- Check for loose connections.
- Check the power outlet by using it for another device.
- Replace the AC power cord.

2. Symptom

Link LED does not light after connection is made.

Probable Causes

- Switch port, network card or cable may be defective.

Possible Solutions

- Check that the switch and attached device are both powered on.
- Be sure the network cable is connected to both devices.
- Verify that Category 5 or better cable is used for 10/100 Mbps connections, Category 5 or 5e cable for 1000 Mbps connections, and that the length of any cable does not exceed 100 meters (328 feet).
- Check the network card and cable connections for defects.
- Replace the defective card or cable if necessary.

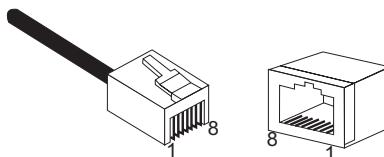
CABLES

Cable Specifications

Cable Types and Specifications			
Cable	Type	Max. Length	Connector
10BASE-T	2-pair Cat. 3 or better 100-ohm UTP	100 m (328 ft)	RJ-45
100BASE-TX	2-pair Cat. 5 or better 100-ohm UTP	100 m (328 ft)	RJ-45
1000BASE-T	4-pair Cat. 5 or better 100-ohm UTP	100 m (328 ft)	RJ-45

10BASE-T/100BASE-TX Pin Assignments

Caution: **DO NOT** plug a phone jack connector into any RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.



Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for RJ-45 connections: 100-ohm Category 3 or better cable for 10 Mbps connections or 100-ohm Category 5 or better cable for 100 Mbps connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

Because all ports on this switch support automatic MDI/MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. In straight-through cable, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1, 2, 3 and 6 at the other end of the cable.

The table below shows the 10BASE-T/100BASE-TX MDI-X and MDI port pinouts.

Pin	MDI-X Signal Name	MDI Signal Name
1	Receive Data plus (RD+)	Transmit Data plus (TD+)
2	Receive Data minus (RD-)	Transmit Data minus (TD-)
3	Transmit Data plus (TD+)	Receive Data plus (RD+)
6	Transmit Data minus (TD-)	Receive Data minus (RD-)
4,5,7,8	Not used at 10/100 Mbps	Not used at 10/100 Mbps

1000BASE-T Pin Assignments

The table below shows the 1000BASE-T MDI and MDI-X port pinouts. These ports require that all four pairs of wires be connected. Note that for 1000BASE-T operation, all four pairs of wires are used for both transmit and receive.

Use 100-ohm Category 5 or 5e unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for 1000BASE-T connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

Pin	MDI-X	MDI
1	Bi-directional Data Two Plus (BI_D2+)	Bi-directional Data One Plus (BI_D1+)
2	Bi-directional Data Two Minus (BI_D2-)	Bi-directional Data One Minus (BI_D1-)
3	Bi-directional Data One Plus (BI_D1+)	Bi-directional Data Two Plus (BI_D2+)
4	Bi-directional Data Four Plus (BI_D4+)	Bi-directional Data Three Plus (BI_D3+)
5	Bi-directional Data Four Minus (BI_D4-)	Bi-directional Data Three Minus (BI_D3-)
6	Bi-directional Data One Minus (BI_D1-)	Bi-directional Data Two Minus (BI_D2-)
7	Bi-directional Data One Plus (BI_D3+)	Bi-directional Data One Plus (BI_D4+)
8	Bi-directional Data Three Minus (BI_D3-)	Bi-directional Data Four Minus (BI_D4-)

1000BASE-T Cable Requirements

All Category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected. However, it is recommended that for all critical connections, or any new cable installations, 4-pair Category 5e (enhanced Category 5) cable should be used. The Category 5e specifications include test parameters that are only recommendations for Category 5. Therefore, the first step in preparing existing Category 5 cabling for running 1000BASE-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3ab standards.

Cable Testing for Existing Category 5 Cable

Installed Category 5 cabling must pass tests for Attenuation, Near-End Crosstalk (NEXT), and Far-End Crosstalk (FEXT). This cable testing information is specified in the ANSI/TIA/EIA-TSB-67 standard.

Additionally, cables must also pass test parameters for Return Loss and Equal-Level Far-End Crosstalk (ELFEXT). These tests are specified in the ANSI/TIA/EIA-TSB-95 Bulletin, “The Additional Transmission Performance Guidelines for 100 Ohm 4-Pair Category 5 Cabling.”

Note that when testing your cable installation, be sure to include all patch cables between switches and end devices.

Adjusting Existing Category 5 Cabling

If your existing Category 5 installation does not meet one of the test parameters for 1000BASE-T, there are basically three measures that can be applied to try to correct the problem:

1. Replace any Category 5 patch cables with high-performance Category 5e or 6 cables.
2. Reduce the number of connectors used in the link.
3. Reconnect some of the connectors in the link.

PRODUCT SPECIFICATIONS

EZ Switch 10/100/1000

Standards Conformance

IEEE 802.3

IEEE 802.3u

IEEE 802.3x

IEEE 802.3ab

Communication Rate

10, 100, and 1000 Mbps

Communication Mode

Full or half duplex at 10/100 Mbps

Full duplex at 1000 Mbps

Media Supported

10BASE-T: 100-ohm Category 3 or better twisted-pair

100BASE-TX: 100-ohm 2-pair Category 5 or better twisted pair

1000BASE-T: 100-ohm 4-pair Category 5/5e twisted-pair

Indicator Panel

Power

Ports: Link/Act, 100/1000M

Dimensions

33 x 23 x 4.4 cm (12.99 x 9.06 x 1.73 in.)

Weight

2.494 kg (5.05 lbs)

MAC Address Table

8 K entries

Memory Buffer

400 Kbits on-chip frame buffer

Power Consumption

38 Watts

Heat Dissipation

130 BTU/hr maximum

Power Requirement

Input Voltage: 100 - 240 VAC@50/60 Hz

Temperature

Operating: 0 ~ 40 °C / 32 ~ 98 °F

Storage: -40 ~ 70 °C / -40 ~ 158 °F

Humidity

10% to 90% non-condensing

EMC/Safety Compliances

CE Mark

Immunity

EN 61000-4-2/3/4/5/6/8/11

Emissions

FCC Class A, CISPR Class A, EN 61000-3-2/3

Safety

CSA/NRTL (C22.2.950, UL 1950)

TUV/GS EN60950, (IEC 950)

PRODUCT SPECIFICATIONS

FOR TECHNICAL SUPPORT, CALL:

From U.S.A. and Canada (24 hours a day, 7 days a week)

(800) SMC-4-YOU; Phn: (949) 679-8000; Fax: (949) 679-1481

From Europe : Contact details can be found on

www.smc-europe.com or www.smc.com

INTERNET

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european.techsupport@smc-europe.com

Driver updates:

http://www.smc.com/index.cfm?action=tech_support_drivers_downloads

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<http://www.smc.com>

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Korea:	82-2-553-0860;	Fax 82-2-553-7202
Japan:	81-45-224-2332 ;	Fax 81-45-224-2331
Australia:	61-2-8875-7887;	Fax 61-2-8875-7777
India:	91-22-8204437 ;	Fax 91-22-8204443

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Pub. Number: 150000009400H E122003-R01